

PEARSON ISLAND EXPEDITION 1969. — 8. HELMINTHS

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Summary

This paper deals with helminths collected at Pearson I. (P.I.) and near-by Flinders I. (F.I.) off the western coast of South Australia. Most of them are nematodes, but preliminary identifications have been made of trematodes and cestodes. New nematodes described are *Skrjabinodon parasmythi* from *Underwoodtsaurus milii* (F.I.) and *Phyllodactylus marmoratus* (F.I.); *S. leristae* from *Lerista* sp. (F.I.); *Cloacina pearsoni* from *Petrogale penicillata* (P.I.); *Rictularia pearsoni* and *Gongylonema beveridgei* from *Rattus fuscipes* (P.I.). A new genus, *Cristaceps* (? Amidostomatidae), is proposed for *Pharyngostromylus woodwardi* Wood, two females of which were taken from *Petrogale penicillata* (P.I.). *Thelandros kartana* Johnston and Mawson, recorded from *Amphibolurus fionii* (?) (P.I.), *Lerista* sp. and *Hemierglis peronii* (F.I.), is transferred to *Parapharyngodon* Chatterji. Other species recorded, mostly with some redescription and figures are: *Cloacina petrogale* Johnston and Mawson, *Labiostrongylus longispicularis* Wood, *Rugopharynx australis* (Mönnig), and *Macropostrongylus pearsoni* Johnston and Mawson, all from *Petrogale penicillata* (P.I.); *Subulura ortleppi* Inglis from *Rattus fuscipes* (P.I.); *Pharyngodon kartana* Johnston and Mawson from *Underwoodtsaurus milii* (F.I.), *Skrjabinelazia* sp. from *Phyllodactylus marmoratus* (P.I.), and *Physaloptera* sp. from *Rattus fuscipes*, are also recorded.

Trematodes recorded are *Paradistomum crucifer* (Nicol) from *Phyllodactylus marmoratus* (P.I.) and dicrocoeliids from *Amphibolurus fionii* (?) (P.I.) and *Rattus fuscipes* (P.I.). Cestodes recorded are *Oëchoristica* sp. from *Lerista tetradactyla* (P.I.) and *Hepatotaenia* sp. from *Rattus fuscipes* (P.I.).

Introduction

The helminths described in this paper were collected during and after the 1969 Expedition to the Pearson Islands, organised by the Royal Society of South Australia and the South Australian Department of Fisheries and Fauna Conservation. The Pearson Islands are a small group lying about 40 miles off the coast of South Australia at the eastern end of the Great Australian Bight. The largest of these, Pearson I. is about 162 hectares in extent, the others very much smaller. Several scientific expeditions have been made to the group which is otherwise visited only by fishermen, for shelter or for bait. Accounts of the geomorphology, land and marine vegetation, and fauna, are also given in this volume of the Transactions.

The animals examined on the island for helminths were lizards and rats, collected by Dr. Michael Smyth, of the Department of Zoology, University of Adelaide. Later, more helminths were collected from animals which died after being brought back to the mainland. Two nematodes from *Rattus fuscipes murrayi*, from Pearson I., believed to have been collected by the Wood Jones Expedition of 1923, and hitherto unexamined, are also included.

Flinders Island, about 32 km (20 miles)

northeast of the Pearson group, is a larger island which has been grazed and farmed for many years. It was visited on the way to Pearson Island on the 1969 expedition, and parasites of lizards collected there are included in this report.

The most commonly found helminths were nematodes, which are described in this paper. Three collections of cestodes were sent to Dr. John Hickman of the Zoology Department, University of Tasmania, who has kindly given preliminary identifications for inclusion in this paper. Three collections of trematodes have been identified, as far as their condition allows, by my colleague Miss Madeline Angel, and these also are listed.

The numbers of animals dissected is too small to allow any deductions of infestation rate or of species relationships with parasites of mainland hosts. Among the lizards, the nematodes present are the same, or closely related, species as those found in other parts of Australia.

The nematodes from the Pearson Island rat are more interesting and have diverse relationships. *Subulura ortleppi* Inglis was hitherto known only from two South African rats, and is the first record of the genus from an Aus-

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Italian rat, *Gongylonema heveridgei* n. sp. represents a genus only once before reported from an Australian rodent, and never from a native *Rattus* sp., although at least 55 of these have been dissected in this laboratory and no specimens of the above genus found. *Rictularia pearsoni* n.sp. is quite different from the two *Rictularia* spp. described from northern Australian rats, and more closely resembles a species from the Philippine Islands. This genus also has not been found in southern Australian mainland rats; it was, however, collected from Pearson I. in 1923.

Large numbers of nematodes were present in the stomach of two rock wallabies examined. Almost all of these belong to three species, two of which, *Labiostromylus longispicularis* Wood and *Rugopharynx australis* (Mönnig), are widespread in macropods all over Australia, while the third, *Macropostrongylus pearsoni* Johnston & Mawson has never been found elsewhere than on Pearson I.

The type specimens of new species described will be deposited in the South Australian Museum, and paratypes retained in the Helminthological Collection of the Zoology Department of the University of Adelaide.

The occurrence of helminths in the animals collected on the expedition is shown in Table 1. No Acanthocephala were found. A list of the helminths, identified as far as possible and arranged under their hosts, is given below, and this is followed by detailed accounts of the nematodes.

Trematoda and Cestoda

Reptiles

AMPHIBOLURUS FIONNI (Proctor)?—Elongate dicrocoeliids, gall bladder and bile duct. Pearson I.

PHYLLODACTYLUS MARMORATUS (Gray).—*Paradistomum crucifer* (Nicoll), gall bladder. Pearson I.

LERISTA TETRADACTYLA (Lucas & Frost).—*Oöchoristica* sp., intestine. Pearson I.

Mammals

RATTUS FUSCIPES (Waterhouse) var. MURRAYI Thomas.—Elongate dicrocoeliids, gall bladder; *Hepatoaenia* sp., intestine.

Nematoda

Reptiles

AMPHIBOLURUS FIONNI (Proctor)?—*Parapharyngodon kartana* Johnston & Mawson, Pearson I.

PHYLLODACTYLUS MARMORATUS (Gray).—*Skrjabinodon parasmythi* n.sp., Flinders I.; *Parapharyngodon kartana* (Johnston & Mawson), *Skrjabinelazia* sp., Pearson I.

UNDERWOODISAURUS MILII (Bory).—*Skrjabinodon parasmythi* n.sp., *Pharyngodon kartana* Johnston & Mawson, Flinders I.

LERISTA sp. (?) n.sp.).—*Parapharyngodon kartana* (Johnston & Mawson), *Skrjabinodon leristae*, Flinders I.

HEMIMERGIS PERONII (Fitzinger).—*Parapharyngodon kartana* (Johnston & Mawson), Flinders I.

Mammals

PETROGALE PENICILLATA (Griffith).—*Rugopharynx australis* (Mönnig), *Cloacina petrogale* Johnston & Mawson, *Cloacina pearsoni* n.sp., *Labiostromylus longispicularis* Wood, *Macropostrongylus pearsoni* Johnston & Mawson, *Cristiceps woodwardi* (Wood), Pearson I.

RATTUS FUSCIPES (Waterhouse) var. MURRAYI Thomas.—*Rictularia pearsoni* n.sp., *Gongylonema heveridgei* n.sp., *Physaloptera* sp., *Subulura ortleppi* Inglis, Pearson I.

NEMATODA

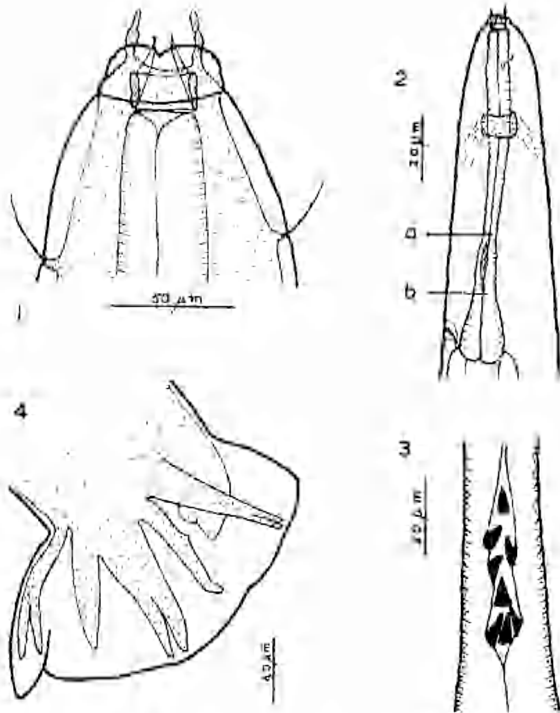
Cloacina petrogale Johnston & Mawson, 1938: 277, from *Petrogale penicillata* (syn. *P. lateralis*), Central Australia: J. & M., 1941a, from *Thylogale eugenii*, Kangaroo I.; J. & M., 1941b, from *Petrogale penicillata*, Pearson I. and *Thylogale flindersi*, Flinders I.

FIGS. 1-4

Host and locality: *Petrogale penicillata*, Pearson I.

The measurements of the one male and three female specimens of the present collection are given in Table 2.

In the new material (and in the paratype material) oesophageal teeth are present in an elongate group at the level of a slight swelling of the oesophagus just in front of the terminal bulb (Fig. 3). Features which, combined, distinguish *C. petrogale* from other *Cloacina* spp. are: the elongate submedian cephalic papillae, the relatively deep and thin-walled buccal capsule, the anterior position of the cervical papillae, the rather long oesophagus with a group of teeth in the lumen just anterior to the terminal swelling, the nerve ring at about a quarter the length of, and excretory pore near the posterior end of, the oesophagus, and the spicule length about a third of the body length.



Figs. 1-4. *Cloacina petrogale*. Fig. 1.—Anterior end. Fig. 2.—Oesophageal region. Fig. 3.—Enlargement of oesophagus in region a-b in Fig. 2. Fig. 4.—Lateral view of bursa.

***Cloacina pearsoni* n.sp.**

FIGS. 5-8

Host and locality: *Petrogale pearsoni*, Pearson I.

Six males and four females were collected; measurements are given in Table 2. The submedian cephalic papillae are small, with the distal segment of each distinctly shorter than the proximal. The buccal capsule is almost cylindrical and is relatively deep (external diameter 20-25 μ m, depth 8-11 μ m). The oesophagus is very slightly swollen just anterior to the nerve ring (about midlength) and has a terminal bulb. The cervical papillae are well back, a short distance in front of the level of the nerve ring. The excretory pore is in the region of the terminal bulb of the oesophagus. No oesophageal teeth were observed.

The tail of the female is conical, ending in a fine point. The vulva lies about one tail length anterior to the anus. The ovejectors join quite near the vulva but the vagina makes a short forward loop before passing to the vulva.

In the male the alate spicules are about a

third of the body length. A gubernaculum is present. The bursal lobes are separated from each other by slight indentations. The arrangement of the bursal rays is shown in Fig. 8. The genital cone is well developed and bears two small rounded accessory lobes dorsally.

The species is close to *C. elegans* J. & M., 1938, *C. digitata* J. & M., 1940b, and *C. liebigi* J. & M., 1938, but differs from these in one or more of the following features: absence of thick inflated cervical cuticle, position of the excretory pore, presence of pre-neural swelling of the oesophagus, and the length and course of the vagina.

***Macropostrongylus pearsoni* Johnston & Mawson, 1940a, from *Petrogale penicillata*, Pearson I.**

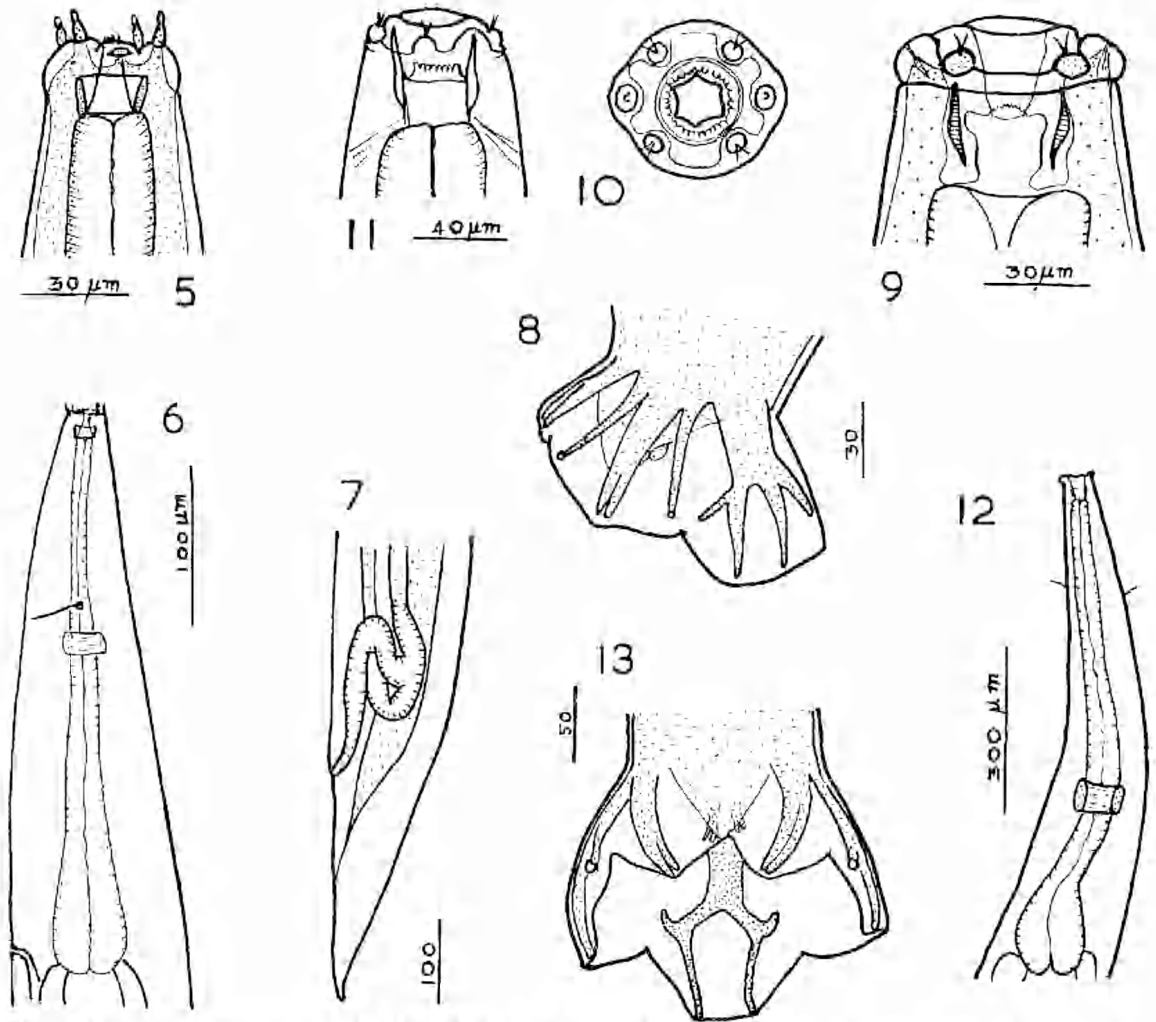
FIGS. 9-13

Host and locality: *Petrogale penicillata*, Pearson I.

The original description of this species was based on two specimens, one male and one female. Many specimens are available, as this was the most numerous nematode in the stomach of the wallaby. These are in a better condition than the old material and a fuller description can now be given. Measurements are shown in Table 2.

The cuticle over the anterior end forms a six-lobed plate, most clearly seen in *en face* view, which continues into the buccal cavity, around which it forms a more or less cylindrical wall in which the more strongly sclerotised buccal capsule itself is embedded. At about the mid-length of the buccal cavity the lining material projects into the lumen as a shelf or frill. In the type specimens this labial cuticle inside the mouth is not so thick and the shelf appears thinner and more rigid; this is the condition in a specimen (Fig. 11), which was given to me by Mr. Beveridge and which was possibly preserved differently. The shelf is not formed of "numerous tooth-like projections" but is continuous, though irregularly pleated; presumably this projecting flap, which is at different angles to the long axis of the worms, in different specimens, serves in some way to strain the food entering the mouth. The wall of the buccal capsule proper is thicker at its mid-length than at either end, and it is radially striated.

The four sub-median cephalic papillae lie between lobes of the anterior cuticular plate; each bears a pair of small forwardly directed



Figs. 5-8. *Cloacina pearsoni*. Fig. 5.—Anterior end. Fig. 6.—Oesophageal region. Fig. 7.—Posterior end of female. Fig. 8.—Dorso-lateral view of bursa.

Figs. 9-13. *Mucropostrongylus pearsoni*. Figs. 9, 10.—Median and *en face* views, respectively, of head, to same scale. Fig. 11. Head of female in which "lining" of buccal capsule is thin. Fig. 12.—Oesophageal region. Fig. 13.—Ventral view of bursa. All scales given in μm .

setae. The amphids open on a large papilla-like elevation of the cuticle, larger than the cephalic papillae. The thread-like cervical papillae are at about a third of the length of the oesophagus from the anterior end.

The anterior two-thirds of the oesophagus is cylindrical, and is followed by a slightly narrower part ending in a bulb. The nerve ring surrounds the junction of the two parts, and the excretory pore is immediately posterior to this.

The tail of the female tapers gradually to end in a short conical point. The length of the vagina is about equal to that of the tail,

and the distance between vulva and anus a little less than the length of the tail. The eggs are about 150 by 60 μm . The egg length given in the original description was obviously a misprint. The spicules are 1/5.7-6.7 of the body length. They are alate for most of their length, and end in simple tips. The heart-shaped gubernaculum appears to have a keel which lies between the spicules. The bursa is longer dorsally than ventrally. The arrangement of the rays is shown in Fig. 13. The ventro-lateral rays and the externo-dorsal rays do not reach the edge of the bursa and their tips lift the bursa outwards. The tips of the two lateral

branches of the dorsal ray bend inwards, pushing the bursa in. The genital cone is well developed, and the accessory cone, or dorsal lip of the cloacal aperture, bears two bifid processes (Fig. 13).

Labiostromylus longispicularis Wood, 1930, from *Macropus bernardus*, Western Australia (?); Johnston & Mawson, 1938, from *Macropus robustus*, Central Australia; J. & M., 1940, from *Petrogale penicillata*, Pearson I.*

FIGS. 14-15

Host and locality: *Petrogale penicillata*, Pearson I.

Labiostromylus longispicularis has been recorded from many species of macropods and from most parts of Australia. The present specimens are rather shorter than those previously recorded for the species. The genital cone is well developed, and the accessory cone bilobed, each lobe carrying a small projection which is bifid distally. In some specimens the

distal portions are asymmetrical (Fig. 15). The dorsal ray is the typical shape for the species, although in some specimens this too is misshapen (Fig. 14). The spicules are longer in relation to the body length than in the type specimens.

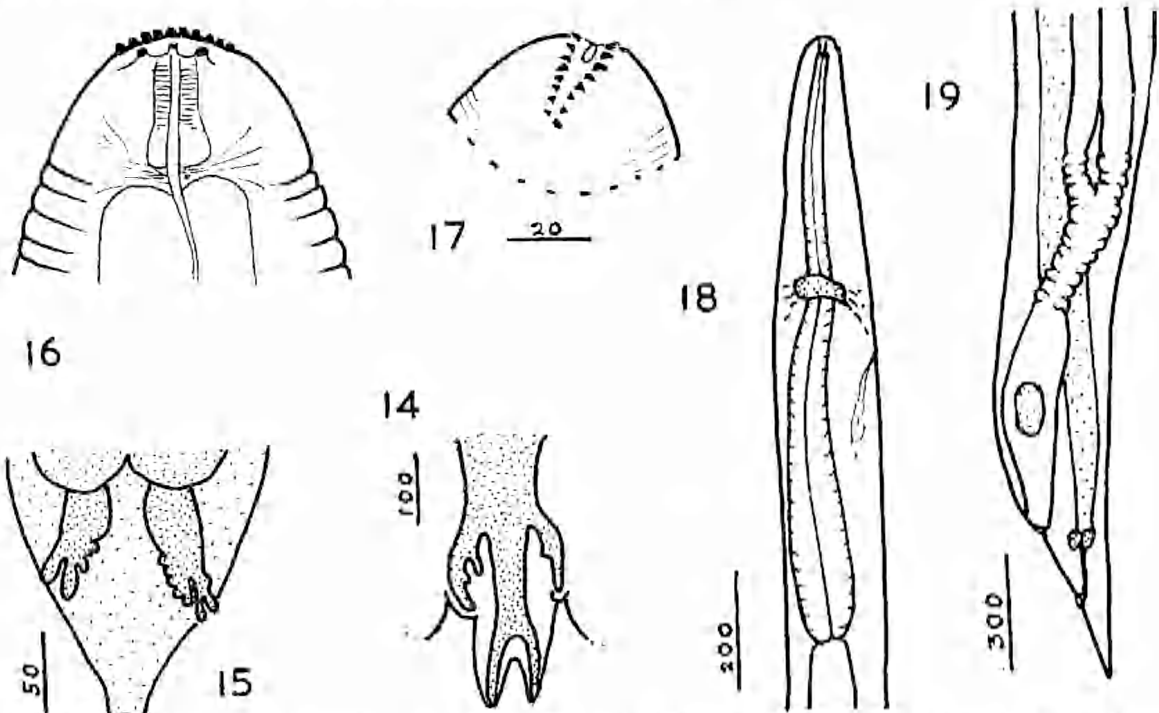
Rugopharynx australis (Mönnig); Wood, 1929, from *Macropus bernardus*, Western Australia (?); Mawson, 1964, from *Megaleia rufa*, New South Wales and Queensland; *M. giganteus*, Queensland.†

Spirostrongylus australis Mönnig, 1926, from *Macropus rufus*, S. Africa (Zoo).

Pharyngostromylus alpha Johnston & Mawson, J. & M., 1938, from *Petrogale penicillata* Central Australia; J. & M., 1940a, from *Petrogale penicillata*, *Macropus melanops* Pearson I., S.A.

Pharyngostromylus beta Johnston & Mawson, J. & M., 1938, from *Petrogale penicillata*, Central Australia; J. & M., 1940a, from *Macropus melanops*, *Petrogale penicillata*, *Thylogale flindersi*, South Australia.

Host and locality: *Petrogale penicillata*, Pearson I.



Figs. 14-15. *Labiostromylus longispicularis*. Fig. 14.—Dorsal ray of aberrant shape. Fig. 15.—genital cone and accessory cone.

Figs. 16-19. *Cristiceps woodwardi*. Figs. 16 & 17.—Lateral and semi-en face views of head, to same scale. Fig. 18.—Oesophageal region. Fig. 19.—Posterior end of body. All scales given in μm .

* Records listed here are only those where some description is given, or to a Pearson I. occurrence.

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Rugopharynx australis is a species widespread in macropods all over Australia; it was recorded from the Pearson Island Wallaby by Johnston and Mawson (1940, p. 97). In the present collections it is the second most abundant species in the stomach. The species was redescribed (Mawson 1964, p. 245) and the new specimens, though slightly smaller, closely resemble those from the mainland hosts.

Cristiceps woodwardi (Wood) n. comb.
Pharyngostrongylus woodwardi Wood, 1930.
from *Macropus bernardus* (Syn. *M. woodwardi*), Western Australia (?).

FIGS. 16-19

Host and locality: *Petrogale pearsoni*, Pearson I.

Only two females of this species were found. The collector, Mr. Ian Beveridge, stated that they were partly in the mucosa of the stomach, and were removed only with some difficulty. This is the situation in which the type specimens were found.

The unusual cuticular ornamentation of the head identifies the specimens as being close to Wood's species, and in all points they agree with his description. The small differences of measurements (Table 1) are negligible, and no new species is proposed for them, in spite of the wide geographical separation of the hosts.*

As Wood points out, there are distinct differences between this species and the type species of *Pharyngostrongylus* Yorke & Maplestone, 1926, and a new genus, *Cristiceps*, is now proposed for it, with the following diagnosis: ? Amidostomatidae: (sensu Inglis 1968). Long slender worms; anterior end rounded, with apical cuticle raised into two dorso-ventral rows of small denticles; small oval mouth between these. Four small submedian papillae and two distinct amphids lying close to, but lateral from, the rows of denticles; buccal capsule well chitinised, more or less cylindrical, striated; oesophagus narrow in first half, widening in second half. *Male*: spicules equal, similar, long and straight, bursa directed dorsally, ventral rays together, ventro-lateral separate, medio- and postero-laterals together, externo-dorsal separate but arising from lateral stem, dorsal divided to base, each branch long and

slender, bifurcating near tip. Gubernaculum present. *Female*: tail conical, vulva shortly in front of anus, vagina long, uteri and ovjectors directed anteriorly. Parasitic in gastric mucosa of Australian marsupials (macropods).

Type species: *W. woodwardi* (Wood), syn. *Pharyngostrongylus woodwardi* Wood, 1931.

Systematic position of the genus. No satisfactory classification has yet been published of the strongyle nematodes from the stomach of Australian macropods, largely perhaps because of the lack of detail in the earlier descriptions of some of these. The characters of the head (the cuticular ornamentation and particularly the complete absence of any lips or "labial roll") separate *Cristiceps* from the various Trichoneminae (sensu Yorke & Maplestone 1926) from macropods and wombats, in particular from the three main groups, as follows:

1. The pharyngostrongyle group (*Pharyngostrongylus*, *Oesophagonastes*, *Rugopharynx* and *Pararugopharynx*) in which there is a buccal ring as well as a vestibule, and in which a leaf crown, internal or external, may or may not be present.
2. The labiostrongyle group (*Labiostrongylus*, *Zoniolaimus*, *Parazonioluminus*), in which the lips are very well developed and a leaf crown absent.
3. The group including *Cloacina*, *Phascolostrongylus*, and *Mucropostrongylus*, in which an internal leaf crown arises from a cylindrical buccal capsule.

The small simple mouth and rounded anterior end with denticulate ornamentation are also different from any genus so far described. However, the long slender body, the situation of the cephalic papillae, as well as the location in which the species is found, are suggestive of *Filarinema* spp. (Mönnig 1929; Mawson 1964). It is probable that the species may belong in the Amidostomatidae (sensu Inglis 1968), although the strongly chitinised buccal capsule is different from that of any other genus ascribed to this family. The bilateral symmetry of the head shows a convergence with the spirurid parasites of the stomach wall of other mammals and birds, as pointed out by Inglis (1965).

* Wood gave the origin of the host, which had died in captivity in England, as Western Australia. The range of *Macropus bernardus* (Woodward's Wallaroo) is given by W. D. L. Ride (1970) as "interior of Arnhem Land", i.e. in the Northern Territory.

Inglis in his comprehensive study of Australian trichostrongyles considers that all trichostrongyloid genera recorded from Australian animals fall into the family Amidostomidae Travassos, 1919. In his revised definition of this family, Inglis states that the latero-dorsal (= externo-dorsal) rays "arise from the base of the dorsal ray". This is an oversimplification, as in many species the externo-dorsal ray appears to have no special connection with the dorsal ray, and this is the case in *Cristiceps woodwardi*, according to Wood's description.

***Rictularia pearsoni* n.sp.**

FIGS. 20-26

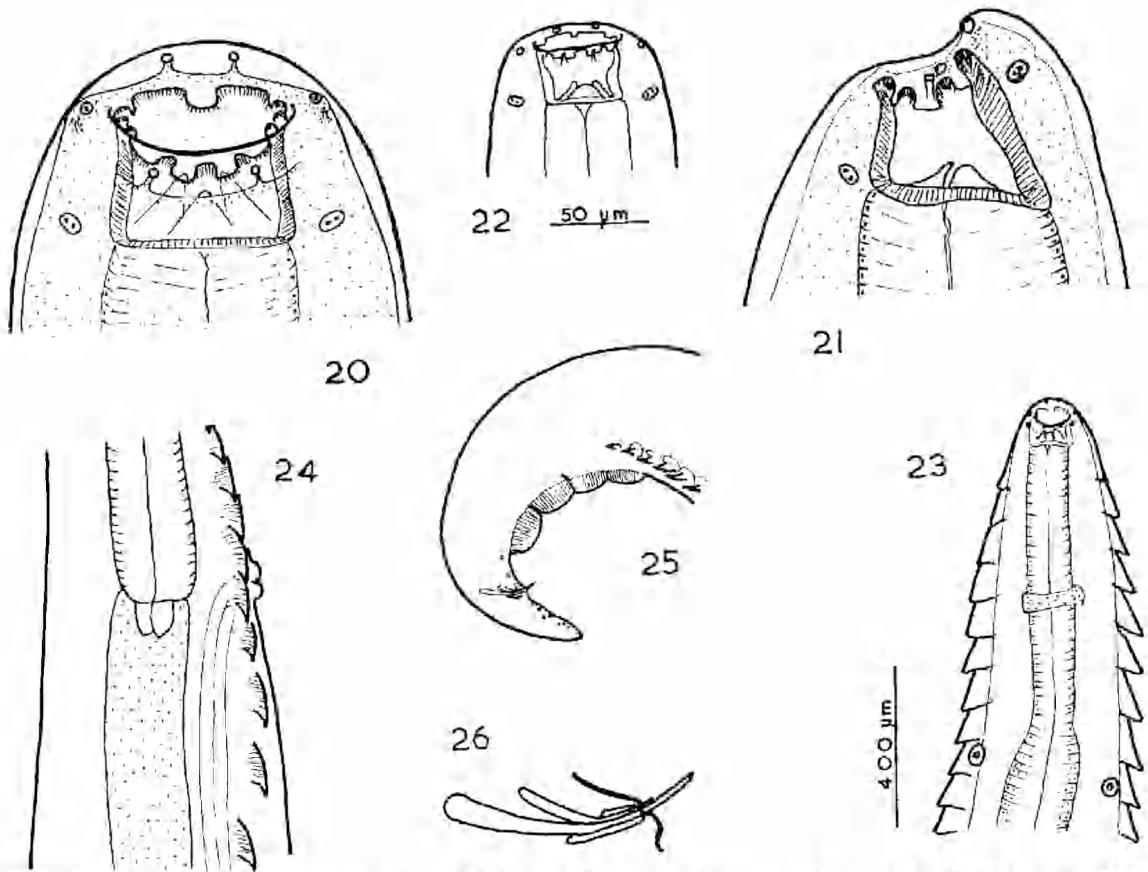
Host and locality: *Rattus fuscipes murrayi*, Pearson I.

Females of a species of *Rictularia* were taken from two of four rats dissected in 1969, and a male and a female of the same species are present in a collection from the same host

species, apparently made during the 1923 expedition to the Pearson I. Male and females are all smaller than *Rictularia* spp. described from other Australian rats. The measurements are given in Table 2.

In both sexes the lateral spines continue throughout the body length. Those of the oesophageal region are imbricate, behind this more hook-like (Fig. 23). The mouth is more or less circular and is only slightly inclined dorsally. The teeth on the anterior border of the buccal capsule are rounded rather than pointed, and are few in number, only 10 or 12. Of these, two are very wide and occupy most of the ventral sector of the border. The two blunt ventral, and the pointed dorsal, oesophageal teeth at the base of the buccal capsule, are short.

The nerve ring lies at about the middle, and the excretory pore at about three-quarters, of the anterior muscular part of the oesophagus.



Figs. 20-26. *Rictularia pearsoni*. Figs. 20 & 21.—Dorsal and lateral views of head of female. Fig. 22.—Dorsal view of head of male. Fig. 23.—Anterior end of female. Fig. 24.—Region of vulva. Fig. 25.—Posterior end of male. Fig. 26.—Spicules and gubernaculum. Figs. 20, 21, 22, and 26 to scale beside Fig. 22; Figs. 23, 24, and 25 to scale beside Fig. 25.

and the cervical papillae just behind it at the level of the eighth or ninth spine.

The tail of the female is short, conical, and ends in a small point. The vulva lies a short distance anterior to the posterior end of the oesophagus; the lips of the vulva are salient, but there is no ornamentation of the cuticle around it, as in other Australian species. The eggs are about 50 by 35 μm .

In the male the spicules are unequal, the shorter about half the length of the longer; a small gubernaculum is present. There are four preanal fans. The caudal papillae are typical of the genus (Fig. 25). The cuticle around the cloaca is not rugose, as in some species of the genus.

Two species of *Rictularia* have been described from Australian rodents, *R. carstairsi* Mawson, 1971, and *R. mackerrasae* Mawson, 1971. The Pearson Island species differs from both of these in the greater number and extent of the lateral spines, in the shape and the small number of peribuccal teeth, and in the distinctly smaller size of both sexes. It differs further from *R. carstairsi* in the inequality of the spicules, and from *R. mackerrasae* in the shape of the buccal capsule. It is close to *R. whartoni* Tubangui, 1931, the male of which was described by Schmidt and Kuntz in 1967, but differs from it in the detail of the dentition, in the spicule length and in the arrangement of the caudal papillae in the male. A new species, *Rictularia pearsoni*, is therefore proposed.

Gongylonema beveridgei n.sp.

FIGS. 26-30

Host and locality: *Rattus fuscipes murrayi*, Pearson I.

A species of *Gongylonema* was present in the stomach of two of four rats dissected by the author. In one there were two females and one male and in the other two females. The females of the second collection were smaller than those of the first, and although numerous eggs were present, these were without shells, and obviously infertile.

In the male the cuticular ornamentation is restricted to the left side of the body and continues only to 350 μm from the anterior end. A lateral ala is present on the right side and continues for the whole body length, widening to form the right caudal ala. In the female the cuticular ornamentation is more extensive and is developed on dorsal and ventral sides of the body, though there is very little directly

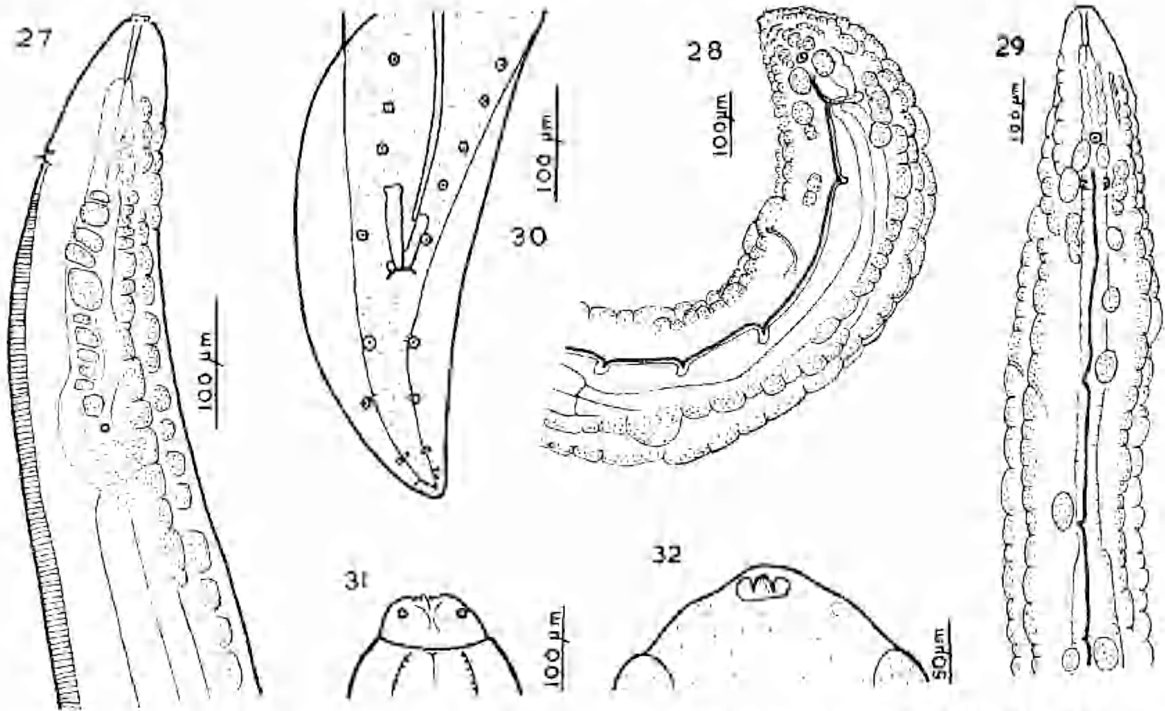
beside each of the two lateral alae, which reach from just behind the cervical papillae to 1.3-1.5 mm from the head. The cuticular bosses reach to 1.5 mm from the head in a 72 mm long specimen. The buccal capsule is 60 μm long in the male and in the shortest female, and 70 μm long in the fertile females.

In both sexes the cervical papillae lie behind the level of the posterior end of the buccal capsule and just in front of the origin of the lateral alae. The nerve ring is just behind the cervical papillae, the excretory pore in the female is at about two thirds the length of the anterior part of the oesophagus, in the male nearer the junction of this with the glandular part. It has been stated by various authors that many of the measurements usually given for nematodes have no specific value in the case of *Gongylonema* spp.; Desportes, Chabaut & Campana (1949) restrict the useful measurements to lengths of the body, buccal capsule, spicules, gubernaculum and tail, the distance of the vulva from the posterior end, and the egg size. In the four female worms of the present collection there is certainly considerable variation in the distance of the nerve ring, cervical papillae, etc. from the anterior end, due largely to the state of contraction of the specimens. The specimen shown in Fig. 29 is a relaxed female, infertile, while Fig. 28 is of the largest female, which is in a somewhat contracted state.

On the conical tail of the female, the phasmids are close to the tip; the vulva lies about a ninth to a tenth of the body length from the posterior end. Eggs in the vagina are 55-60 by 35-36 μm , with thick smooth shells and containing a coiled larva.

In the male the caudal alae meet behind the body; the right ala is wider than the left. The arrangement of the caudal papillae is shown in Fig. 30. The left spicule is nine times the length of the right, the gubernaculum is shorter than the right spicule, spatulate, with a broadened tip.

There are only two records of *Gongylonema* sp. from rodents in Australia: Fielding (1928, p. 126) noted *G. sp.* from *Rattus norvegicus*, *R. rattus*, *Mus musculus*, and *Hydromys chrysogaster*, from north Queensland; and Johnston (1918, p. 61) suggested that eggs from the liver of *Mus musculus* (Sydney) were those of *G. sp.* Many native rodents, including 35 *Hydromys chrysogaster*, have been dissected in this department, but no *Gongylonema* sp. has been found, except for



Figs. 27-30. *Gongylonema beveridgei*. Fig. 27.—Anterior end of male. Figs. 28 & 29.—Anterior ends of contracted and relaxed females, respectively. Fig. 30.—Posterior end of male.

Figs. 31, 32. *Physaloptera* sp. Fig. 31.—Lateral view of head. Fig. 32.—Inside of one pseudolabium.

the two collections from Pearson I. A new species is proposed for these, as they differ from any species of which I have seen a description, in the presence in the male of one lateral ala continuing throughout the body length. The specific name is given in acknowledgement of the help of Mr. Ian Beveridge.

Physaloptera sp.

FIGS. 31, 32

Host and locality: *Rattus fuscipes murrayi*, Pearson I.

Only one female *Physaloptera* sp. was found in the Pearson I. rat. It is 37 μm long, with very short collar surrounding only the bases of the pseudolabia. The submedian papillae are prominent. On the inner surface of each pseudolabium there are two median teeth, the inner of which is heavily built with three blunt cusps, while the other is smaller, and also blunt-tipped. The oesophagus is 6 mm long, with anterior muscular part 800 μm ; the distance from the anterior end of the nerve ring is 600 μm , of the cervical papillae 1110 μm . The vulva lies shortly behind the oesophagus; there are two ovaries. Eggs in the uteri are without shells, apparently infertile.

In the absence of a male it is impossible to assign this worm to a species. It is not unlike *P.roughtoni* Johnston & Mawson, 1941, from *Rattus fuscipes greyi* from Kangaroo Island, South Australia.

Subulura orteppi Inglis, 1960, from *Rhabdomys pumilio* and *Rattus (Praomys) namaquensis*, South Africa.

Host and locality: *Rattus fuscipes murrayi*, Pearson I.

Dr. Inglis has himself kindly verified the identification of these nematodes, and can find no difference between them and his type specimens, except that the Pearson I. ones are rather smaller. *Subulura orteppi* was by no means uncommon in the Pearson I. rats, being present in some numbers in all four rats dissected. *Subulura* sp., not yet determined, occurs also in native rats from Queensland.

Pharyngodon kartana Johnston & Mawson, 1941: 145, from *Underwoodisaurus milii*, Kangaroo I.; J. & M. 1943, from *Phyllodactylus guntheri*, Lord Howe I.

FIG. 33

Host and locality: *Underwoodisaurus milii*, Flinders I.

Pharyngodon kartana was present in each of the three specimens examined of this host. It is apparently widespread in Australia, and is not confined to geckos, as it has been identified (unpublished) from *Hemiergis peronii* from Kangaroo Island. The present specimens differ slightly from the type and other specimens from Kangaroo Island, which have been re-examined, but the variations do not appear to warrant the erection of a new species. Measurements are given in Table 3.

The male worms are very similar to the type, although they are shorter, and the oesophagus and tail spike are slightly longer in relation to the body length. The tail spike bears a few very small spines which have not been seen in the Kangaroo Island specimens.

The female bears narrow double lateral alae from just behind the head to the level of the anus (present in the type material also). The tail spike is about a quarter to a fifth of the body length in the ovigerous female, nearly a half in young females. The spines on the tail are few and though long, are not as stout as indicated by the original figure (J. & M. 1941, Fig. 6). The vulva and the excretory pore shortly in front of the vulva, are oesophageal in all specimens, even, in some very contracted specimens, very close to the head, but in most, at or near the oesophageal bulb. In the Kangaroo Island specimens the vulva is post-oesophageal.

***Skrjabinodon parasmythi* n.sp.**

FIGS. 34-36

Host and locality: *Underwoodisaurus millii* (typehost), *Phyllodoctylus marmoratus*, Flinders Island.

A few males but no female were present in each of three *U. millii* dissected; one specimen of *P. marmoratus* contained five females, only one of which is ovigerous; it is not certain that the females belong to the same species as the males, but both are from geckos in the same region, and the females do not belong to the only other related oxyurid species (*Pharyngodon kartana*) so far found in geckos on Flinders Island.

Measurements are given in Table 3. The species is very similar to *Skrjabinodon smythi* Angel & Mawson, 1968, from geckos near Adelaide, but it is distinguished in the male by the presence of a well-developed spicule, and the relatively shorter tail spike. In the female also the tail spike is relatively shorter, and the few spines on it are slender and pointed, not

rounded as in *S. smythi*. The oesophagus is longer in relation to the body length in both sexes. In these females, as in *S. smythi*, there are narrow double lateral alae.

The only other species described as having a spinous tail in the female and a spicule in the male are *S. apapillosus* (Koo, 1938) in which the tail spines are very much more numerous, and *S. scelopori* (Cuballero, 1938) in which they are very much larger.

***Skrjabinodon leristae* n.sp.**

FIGS. 37-39

Host and locality: *Leristus* sp., Flinders I.

Although this collection consists of only one male and three female worms, and the male is without the extremity of the tail, it apparently represents a new species. Measurements are given in Table 3.

Lateral alae are present in both sexes, and are double in the female. The excretory pore and vulva in the female are at about the level of the bulb of the oesophagus. The male worm is damaged in this region, but the excretory pore cannot be seen in the rest of the body.

A spicule is absent. The arrangement of the caudal papillae of the male are shown in Fig. 39. The tail spike is spinous in both sexes. In the female the spike is 2.6-3.0 times the distance from the anus to the base of the spike. Eggs are 120-125 by 38-40 μm ; polar plugs were not seen.

The species differs from *S. smythi* Angel & Mawson in the more posterior position of the anus in relation to the tail spike length, the shorter oesophagus and tail spike (both absolutely and in relation to the body length) and the presence of larger spines on the male tail. It is distinguished from *S. parasmythi* chiefly by the absence of a spicule.

***Parapharyngodon kartana* (Johnston & Mawson) new comb.**

Thelandros kartana Johnston & Mawson, 1941, from *Hemiergis peronii*, Kangaroo Is.; Angel & Mawson, 1968, from *H. peronii*, and *Phyllodoctylus marmoratus*, near Adelaide, S. Aust.

FIGS. 40, 41

Hosts and localities: *Amphibolurus fionii*(?), Pearson I., *Rhodona* sp., *Hemiergis peronii*, Flinders I.

These specimens have been compared with the paratypes and with the specimens described in 1968, and it is noted that alae are present in the male for about two thirds of the body length; the female is not alate. It is there-

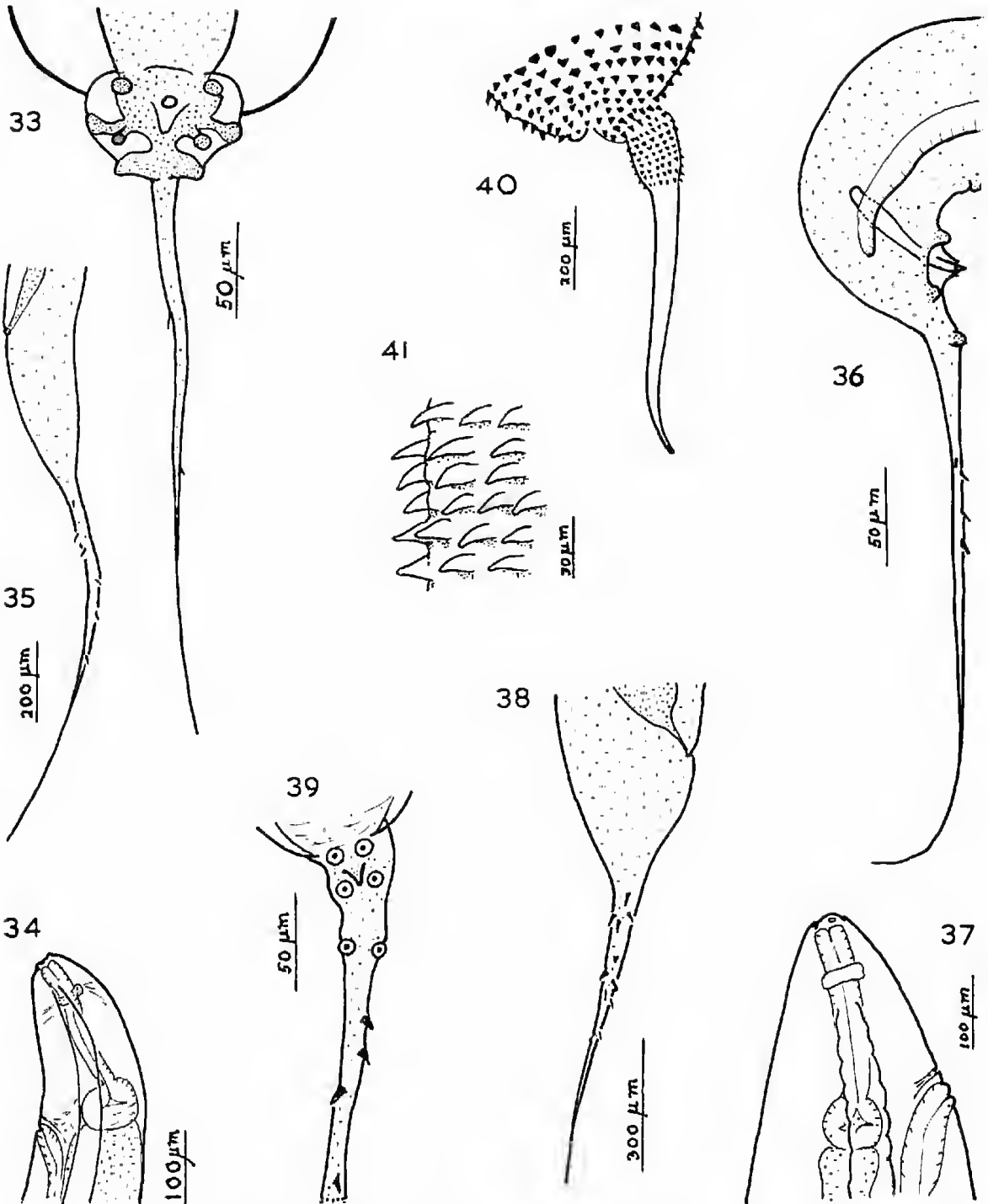


Fig. 33. *Pharyngodon kartana*, tail of male.

Figs. 34-36. *Skrjabinodon parasmythi*. Fig. 34.—Anterior end of female. Fig. 35.—Posterior end of female. Fig. 36.—Posterior end of male.

Figs. 37-39. *Skrjabinodon leristae*. Fig. 37.—Anterior end of female. Fig. 38.—Posterior end of female. Fig. 39.—Cloacal region of male.

Figs. 40, 41. *Parapharyngodon kartana*. Fig. 40.—Posterior end of juvenile. Fig. 41.—Part of the surface of the body of juvenile, near mid-length, showing cuticular spines.

fore necessary to transfer the species to the genus *Parapharyngodon* Chatterji, 1933. It may also be noted that the coils of the ovary reach around the corpus of the oesophagus, though this was omitted from the figure given in 1968 (Angel & Mawson 1968, Fig. 8).

The specimens from Pearson I. and Flinders I. are on the whole larger than those from the Adelaide region and many are larger than those from Kangaroo I. Their measurements are given in Table 3. Among them are five apparently young specimens in which the cuticle is spiny (Fig. 41); the spines are arranged in rings around the body, graduating in size from small anteriorly to large posteriorly as far as the caudal constriction, then ending in a region of tiny spines at the base of the tail spike (Fig. 40). There are no other spines on the tail. This condition appears to be similar to that found by Schad (1960, p. 116) in young specimens of his species *Theladros salamandrae*. Among the present five small, plump, spined specimens from *Rhodona* sp. are four females and one male (spicule present). That the spinous cuticle is a feature of a very young adult rather than of a fourth stage larva is suggested by the condition in two

larger but still young females in which the bases of a few spines are distinct.

Skrjabinelazia sp.

Host and locality: *Phyllodactylus marmoratus*, Pearson I.

Only three female worms are present, and in the absence of a male the generic identification is not definite. Females of a similar species were recorded from the same host species from near Adelaide (Angel & Mawson, 1968).

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TABLE 1

Incidence of helminths.

This table lists only those hosts dissected by the author. Some of the specimens referred to in the text were collected by other people. P.I. indicates Pearson I., F.I. Flinders I.

Host	Locality	Number dissected	Number parasitised	Number yielding:		
				Trematoda	Cestoda	Nematoda
<i>Phyllodactylus marmoratus</i> (Gray)	{ P.I.	6	2	1	—	2
	{ F.I.	5	2	—	—	2
<i>Underwoodisaurus milii</i> (Bory)	F.I.	3	3	—	—	3
<i>Amphiholurus fionni</i> (Proctor)?	P.I.	11	10	2	—	10
<i>A. striatus</i>	F.I.	1	0	—	—	—
<i>Lerista tetradactyla</i> (Lucas & Frost)	{ P.I.	5	1	—	1	1
	{ F.I.	2	0	—	—	—
<i>Lerista</i> sp. (? n. sp.)	F.I.	4	3	—	—	3
<i>Hemieryx peranii</i> Fitzinger	{ P.I.	2	0	—	—	—
	{ F.I.	9	5	—	—	5
<i>Ablepharus greyi</i> (Gray)	F.I.	3	0	—	—	—
<i>A. lineocellatus</i> (Dumeril & Bibron)	P.I.	1	0	—	—	—
<i>Petrogale penicillata</i> (Griffith)	P.I.	1	1	—	1	1
<i>Rattus fuscipes murrayi</i> Thomas	P.I.	4	4	1	3	3

TABLE 2

Measurements of strongyle and spirurid species described in the text; unless otherwise indicated all measurements are in μm .

	<i>Macrostrongylus pearsoni</i>	<i>Cloacina elegans</i>	<i>Cloacina petrogale</i>	<i>Labiostrongylus longispicuaris</i>	<i>Cristiceps woodwardi</i>	<i>Rictularia pearsoni</i>	<i>Gongylonema beveridgei</i>
<i>Male</i>							
Length (mm)	5.7—6.5	3.1—5.0	6.1	19.0	—	4.6	12.0
Oesophagus, total length	870—930	400—430	880	5650	—	1400	3000
Ant. part of oesoph.	—	—	—	1400	—	—	400
Ant. end—nerve ring	520—580	180—210	—	1200	—	—	195
—cervic. pap.	150—190	115—150	80	?	—	—	130
—excr. pore	550—610	320—370	840	10030	—	{ 140	360
spicule length (s)	940—1010	1200—1600	2300	—	—	{ 80	810
							90
							60
							4
<i>gubernaculum</i>							
length/oes. length	6.1—7.0	7.7—11.9	6.9	3.4	—	—	—
length/spicule length	5.7—6.7	2.6—3.1	2.6	1.8	—	—	—
<i>Female</i>							
Body length	6.9—7.3	4.2—4.8	7.6	—	25.0, 29.5	—	64, 72
Oesoph.	940—990	400—430	1000	—	940, 1100	—	5200, 7200
Ant. part of oesoph.	500—640	190—210	300	—	—	—	800, 920
Ant. end—nerve ring	220—250	130—160	110	—	380, 450	—	310, 200
—cervic. pap.	530—690	370—390	950	—	550, 700	—	140, 100
—excr. pore	740—790	270—370	210	—	500, 700	—	?
Postr. end—vulva	450—500	130—180	390	—	310, 450	—	?
Tail	7.0—7.6	9.7—12.0	7.6	—	190, 190	—	7800, 6200
Length/oesophagus	—	—	—	—	26.5, 26.8	—	340, 330
							10, 12
							8

* two fertile females, somewhat contracted

† infertile female, relaxed

TABLE 3

Measurements of oxyurids.

Measurements are given in μm unless otherwise stated. Under *Parapharyngodon kartana* measurements under (a) are of specimens from *Amphibolurus fionni*, those under (b) of specimens from *Lerista* sp.

Species	<i>Pharyngodon kartana</i>	<i>Skrjabinodon parusmythi</i>	<i>Skrjabinodon leristae</i>	<i>Parapharyngodon kartana</i> (a)	<i>Parapharyngodon kartana</i> (b)
Male					
length (mm)	1.30—1.64	1.5—2.0	1.3	1.6 (young specimen)	2.3—4.2
oesophagus	300—360	350	—	350	350—780
antr. end—nerve ring	140—150	—	—	150	200
—excr. pore	370—425	400—520	—	500	1150—1400
tail spike	250—280	250—300	—	40	65—90
spicule	—	60—65	—	70	60—65
length—oesophagus	4.1—5.0	4.1—5.7	—	4.6	5.3—7.5
length/tail spike	5.2—6.2	5.7—7.1	—	—	—
Female					
length (mm)	3.5—4.0	3.9	4.2—5.3	4.4—4.8	7.3—8.2
oesophagus	390—450	280	350—400	1000—1100	1500—1950
antr. end—nerve ring	40—150	—	100—105	—	170—200
—excr. pore	300—340	300	260—280	—	1900—2400
vulva	360—400	350	300—310	—	—
tail (incl. spike)	850—1060	1200	850—960	350—400	300—600
tail spike	710—900	900	640—700	—	—
Postr. end—vulva (mm)	—	—	—	2.6	3.7—4.2
length/oesophagus	8.4—9.3	13.9	11.7—15.7	4.4	4.3—5.3
length/tail spike	4.4—5.1	4.3	6.5—7.6	—	—

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